

WHAT IS CLAIMED IS:

1                   1.     Apparatus for expressing milk from a breast comprising  
2                             a milk collector unit having  
3                             a manifold, the manifold having a vacuum path, the vacuum path  
4     having an inlet, an outlet and a midsection between said inlet and said outlet, said outlet  
5     being connected to a vacuum source,  
6                             a collection vessel operatively connected to said midsection of said  
7     vacuum path, and  
8                             a cup assembly, said cup assembly having a housing with an inlet for  
9     the breast, and an outlet operatively connected to said inlet of said vacuum path in said  
10    manifold, said cup assembly also having a liner in said housing, the vacuum path passing  
11    within said liner, said liner being secured with respect to said housing to form a space  
12    which is in communication with a pulsating pressure path and a pulsating pressure source,  
13    pressure in said pulsating pressure path alternately pushing said liner inwardly within said  
14    housing and pulling said liner outwardly during positive and negative portions of a  
15    pulsation cycle, respectively, and  
16                             a vent in said pulsating pressure path providing controlled relief of  
17    pressure during the positive and negative portions of the pulsation cycle.

1                   2.     The apparatus of claim 1 wherein said cup assembly includes a pad  
2     located in the input end of said housing.

1                   3.     The apparatus of claim 1 wherein the pressure in the pulsating path  
2     pulsates at a rate of 41 to about 65 pulses per minute.

1                   4.     The apparatus of claim 1 wherein the vacuum in the vacuum path  
2     varies between about .5" mercury and about 5" mercury through the pulsation cycle.

1                   5.     The apparatus of claim 1 comprising a hollow boss which increases  
2     the area for breast extension during milk expression.

1                   6.     The apparatus of claim 1 comprising a filter between the vacuum  
2     source and the said outlet, said filter being substantially permeable to air when dry or wet,  
3     and substantially impermeable to liquid, fats and solid components in the milk.

1                   7.     The apparatus of claim 1 wherein said milk collector unit further  
2     includes a removable cap, said cup assembly being secured to said milk collector unit by  
3     both said manifold and said cap.

1                   8.     The apparatus of claim 7 wherein said vacuum path passes through  
2     said cap and said manifold to said cup assembly, and

3                   said pulsating pressure path passes through said cap to a pressure  
4   port in said cup assembly, said pressure port being in communication with said space  
5   between said housing and said liner.

1                   9.     The apparatus of claim 1 wherein said vacuum source and said  
2   pulsating pressure source comprise an air pump having a movable diaphragm in a  
3   chamber, a shaft which passes through said diaphragm and a motor which moves said  
4   diaphragm axially, said motor rotating around the axis of said shaft.

1                   10.    Apparatus for expressing milk from a breast comprising  
2                   a milk collector unit having  
3                   a manifold, the manifold having a vacuum path, the vacuum path  
4   having an inlet, an outlet and a midsection between said inlet and said outlet, said outlet  
5   being connected to a vacuum source,  
6                   a collection vessel operatively connected to said midsection of said  
7   vacuum path, and  
8                   a cup assembly, said cup assembly having a housing with an inlet for  
9   the breast, and an outlet operatively connected to said inlet of said vacuum path in said  
10   manifold, said cup assembly also having a liner in said housing, the vacuum path passing  
11   within said liner, said liner being secured with respect to said housing to form a space  
12   which is in communication with a pulsating pressure path and a pulsating pressure source,  
13   pressure in said pulsating path alternately pushing said liner inwardly within said housing

14 and pulling said liner outwardly during positive and negative portions of a pulsation cycle,  
15 respectively,  
16 wherein the pressure in the pulsating path pulsates at a rate of 41 to  
17 about 65 pulses per minute.